REALLOCATION OF THE EOCENE FOSSIL *PALAEOPHASIANUS MELEAGROIDES* SHUFELDT[1]

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In 1913 Shufeldt described a new fossil bird, *Palaeophasianus meleagroides*, from the early Eocene of Wyoming. Shufeldt considered the relationships of *Palaeophasianus* to be within the Galliformes, more particularly with the Tetraonidae and Meleagrididae. On the basis of Shufeldt's published figures Brodkorb (1964:303) placed *Palaeophasianus* in the subfamily Cracinae of the Cracidae with the remark "The shapes of the cotylae and the proximal inner margin of the shaft [of the proximal end of the tarsometatarsus] are reminiscent of *Penelope*, although the large size recalls *Crax*." Brodkorb also suggested that since the type was imbedded in matrix, more preparation of the fossil would be necessary before its relationships could be determined with any certainty.

During the course of other paleontological work on Oligocene birds I had occasion to examine the type of *Palaeophasianus*. Through the courtesy of Dr. Malcolm C. McKenna of the Department of Vertebrate Paleontology of the American Museum of Natural History the type was further prepared, thus allowing a more complete study of the fossil. Subsequent examination has revealed that the relationships of *Palaeophasianus* are not with the galliforms but with the gruiform birds of the family Aramidae. The fossil appears to represent a heretofore unrecognized genus and species of that family. Because the fossil was covered with matrix, Shufeldt's description was incomplete; therefore, it is necessary to redescribe the type material (see Fig. 1).

MATERIAL

American Museum of Natural History No. 5128, Department of Vertebrate Paleontology; the distal end of left tibiotarsus, proximal and distal ends of left tarsometatarsus, and seven or eight broken pieces of one or more long bones; collected by the American Museum expedition of 1910, Willwood Formation, Elk Creek, east of Dry Camp 2, Bighorn Basin. N. W. Wyoming; age: early Eocene (Gray Bull fauna).

Tarsometatarsus.—The proximal end of the tarsometatarsus is similar to the living *Aramus guarauna*, but with (1) the anterior metatarsal groove deeper (may be due, in part, to crushing); (2) intercotylar prominence more horizontal, not projecting upward as much (when viewed from the side); (3) intercotylar prominence well developed but less well defined; (4) internal cotyla larger than external cotyla; (5) intercotylar area more elevated, ridges on inner sides of external and internal cotylae more developed;

[1] Dedicated to Dr. George M. Sutton on the occasion of his 70th birthday.

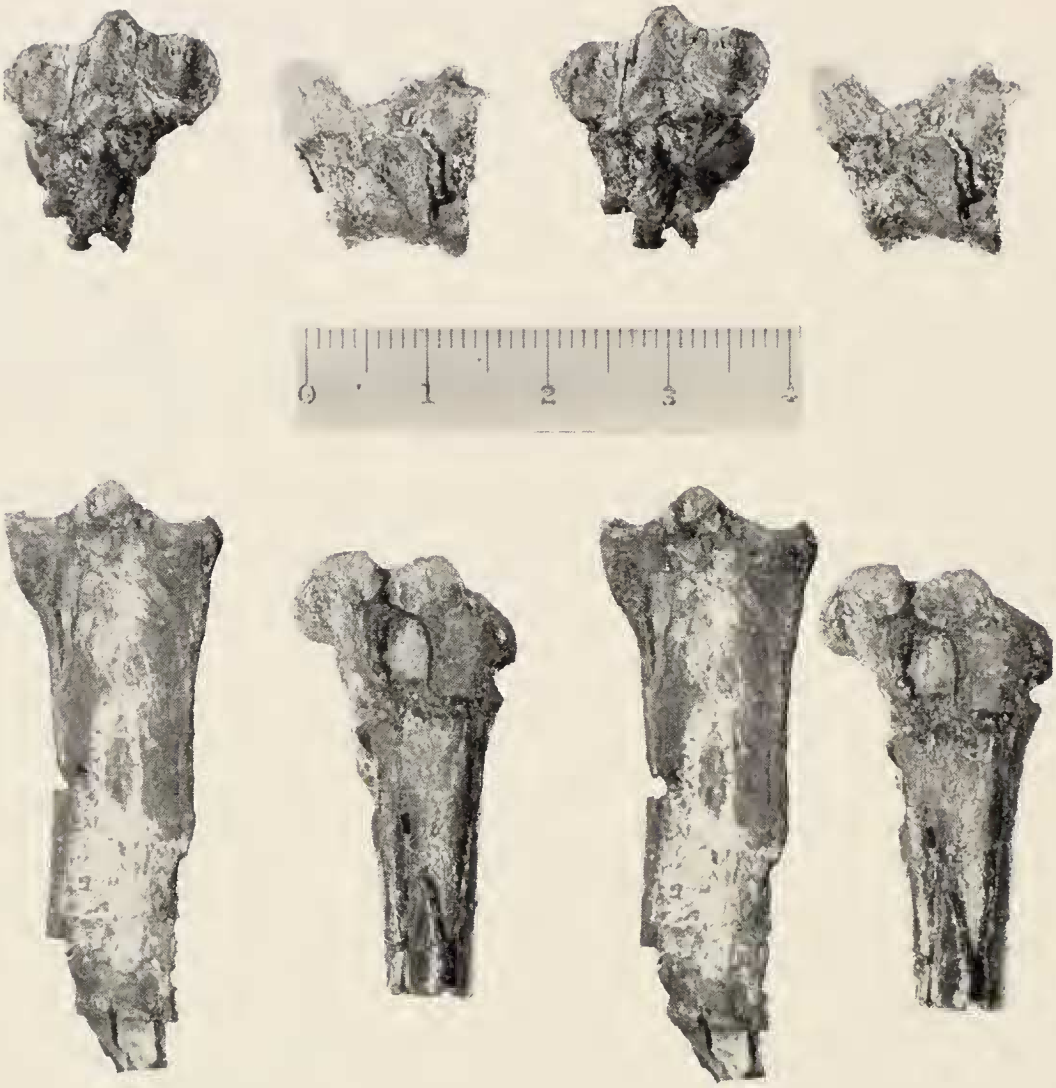

Fig. 1. Stereophotographs of the type of *Palaeophasianus meleagroides*. Upper left, proximal end of tarsometatarsus; upper right, distal end of tibiotarsus; lower left, anterior view of tarsometatarsus; lower right, internal view of tibiotarsus.

(6) slope of anterior margins from the top of the intercotylar prominence to the external and internal cotylae more gradual (from an anterior view); (7) shaft decidedly more triangular in shape (possibly due, in part, to crushing), the sides of the hypotarsus and shaft being more planar; (8) external cotyla somewhat less open anteriorly and posteriorly; (9) internal and external cotylae more round and cup-shaped; and (10) hypotarsus more developed, projecting more posteriorly.

Tibiotarsus.—The fossil is similar to living *Aramus guarauna*, but (1) from anterior view the internal condyle more elevated relative to external condyle (may be partially the result of crushing and displacement of bone); (2) internal condyle thicker basally, more triangular in shape (when viewed from distal end); and (3) rim of external condyle elevated more posteriorly relative to posterior rim of internal condyle (when viewed from distal end).

Measurements.—Tarsometatarsus: greatest breadth of head 18.5 mm; greatest depth of head (measured from tip of intercotylar prominence to most posterior portion of hypotarsus) 19.0 mm; width of shaft 30 mm below top of intercotylar prominence 12.3

mm; tibiotarsus: greatest breadth across condyles 16.5 mm; width of shaft 30 mm from top of internal condyle 9.6 mm; depth of shaft 30 mm from top of internal condyle 7.5 mm; greatest width of external condyle (measured from anterior to posterior) 16.0 mm.

DISCUSSION

The hypotarsus of the tarsometatarsus is badly damaged, but portions of several canals are still present. A well marked canal is found on the external side of the hypotarsus, but it is impossible to say whether or not the canal was open or closed posteriorly. In addition, a larger, medial canal and a smaller, internal canal are present, but again, one cannot be sure whether they were grooves (i.e., open) rather than canals (i.e., closed).

Taken by itself a positive identification of the fossil tibiotarsus is difficult. The bone was considerably damaged in preservation and portions of it were probably displaced as fossilization was taking place. Consequently, the above description, especially of the topographical relationships of the condyles to each other, may possibly be somewhat misleading. The fossil tibiotarsus superficially resembles that of tetraonids in some respects, for instance in the more developed, more triangular internal condyle. Unfortunately, the area of the supratendinal bridge is still covered by a very hard matrix and further preparation does not appear possible. The fossil does, however, resemble the Aramidae in general features, and there is no good reason for doubting its inclusion along with the tarsometatarsus in this family.

The distal end of the tarsometatarsus included in AMNH No. 5128 still remains imbedded in matrix on one side, and the shaft and trochleae are so broken up, that if more matrix were removed, the fossil would break apart. Because of this situation, the distal end of the tarsometatarsus cannot be identified in itself. It is also not possible to identify the remaining fragments of the long bones.

Three fossil aramids have been described from the early Tertiary:

Badistornis aramus Wetmore
White River series, Upper Oligocene, South Dakota

Gnotornis aramiellus Wetmore
White River series, Upper Oligocene, South Dakota

Aramornis longurio Wetmore
Snake Creek Beds, Middle Miocene, Nebraska

Palaeophasianus appears to resemble *Badistornis* in certain features, but when compared with Wetmore's description (1940), *Palaeophasianus* differs in the following characters: (1) internal cotyla is not as high relative to the external cotyla; (2) internal cotyla is more round; (3) external cotyla is apparently not as open anteriorly or posteriorly; and (4) comparison with

Wetmore's Figure 7 indicates the anterior margin from the intercotylar prominence to the external cotyla is much less vertical (from an anterior view). All of these characters, along with geologic age differences, suggest that *Palaeophasianus* is generically distinct from *Badistornis*.

Gnotornis is represented by the distal end of a left humerus. The measurements given by Wetmore (1942) indicate *Gnotornis* was approximately one-third the size of either fossil or living limpkins. On the basis of certain characters of the humerus, Wetmore considered *Gnotornis* to be a distinct genus. Because only the humerus of *Gnotornis* is preserved, a comparison with *Palaeophasianus* cannot be made.

Aramornis is represented by the distal end of a left tarsometatarsus. According to the measurements (Wetmore, 1926) *Aramornis* was slightly larger than the Recent genus *Aramus*. A comparison of size between the type of *Aramornis* (AMNH No. 6292) and the damaged tarsometatarsus of *Palaeophasianus* shows that the latter is considerably larger. The tarsometatarsus of *Palaeophasianus* is badly damaged, hence a comparison with *Aramornis* cannot be made.

Shufeldt (1915) placed another fossil (distal end of right tarsometatarsus) from the Bridger Formation of the middle Eocene of Wyoming in the genus *Palaeophasianus*. The fossil (Yale Peabody Museum No. 896) was compared to the types of *Palaeophasianus* and *Aramornis* and to skeletons of *Aramus*. This second specimen is so badly damaged—the trochlea for digit 2 is gone, the posterior side of the trochlea for digit 3 is lacking, and the trochlea for digit 4 is slightly broken—that comparison is difficult. However, there is little doubt that the Yale specimen is larger than *Palaeophasianus meleagroides*. Moreover, certain characters suggest this bone is not a limpkin: the distal foramen is farther removed proximally from the base of the trochlea for digit 3 and the external intertrochlear notch than in *Aramus*, and the base of the trochlea for digit 2 appears not to be directed posteriorly as it is in *Aramus*. The Yale specimen may possibly be an aramid, but because the bone is greatly damaged, positive identification is nearly impossible.

Wetmore (1940:33) believed the differences of *Badistornis* from the Recent genus *Aramus* "tend to ally it to the cranes, the Gruidae, so that it appears ancestral to the modern limpkins. As it gives a closer approach to the cranes than does living Aramus it indicates more certainly the presupposed line of ancient connection between the Aramidae and the Gruidae." *Palaeophasianus* also resembles the Gruidae in some characters but no more so than it does several other families. The resemblances seem better explained on the basis of characters inherent in the tarsometatarsus and tibiotarsus themselves and appear not to be a reflection of relationship.

Included with the Aramidae and Gruidae in the superfamily Gruoidea is the Eocene family Geranoididae (Wetmore, 1933). The type species, *Geranoides jepseni*, is based on the fragmentary remains of the distal ends of a tarsometatarsus and tibiotarsus. The tarsometatarsus is distinctly different from that of the Aramidae. The tibiotarsus of *P. meleagroides* shows some differences from the tibiotarsus of *Geranoides*, notably in the shape of the external condyle. Due to the fragmentary nature of the type material of *Palaeophasianus*, comments about its relationship with *Geranoides* are probably best kept at a minimum at this time.

The placing of *Palaeophasianus* in the Aramidae extends the known occurrence of that family back to the early Eocene and indicates that the family had attained a remarkable diversity by the early Tertiary.

SUMMARY

After further preparation and study, the early Eocene fossil *Palaeophasianus meleagroides* Shufeldt is found not to be a member of the Cracidae but is instead representative of the Aramidae.

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